#149768

9/20/99

SUPERFUND DIVISION
REMEDIAL ENFORCEMENT RESPONSE BRANCH

FIVE-YEAR REVIEW REPORT

SITE NAME: General Mills/Henkel Corporation, MN

INITIAL & DATE

RPM: 9/20/99 MB

FIVE-YEAR REVIEW COORDINATOR (Rosita Clarke): RClk 9/21/99

SECTION CHIEF: SYPNIEWSKI 9/22/99

JAMES N. MAYKA: 9/22/99

WILLIAM E. MUNO: WEM 9/23/99

RETURN TO: Gladys Beard

PHONE#: 6-7253

COMMENTS: Although Remedy Performance is mentioned within the Report under each subsection of Remedial Objectives A separate Section for ~~Remedy Performance~~ Areas of Noncompliance should be incorporated into the Report. RClk

(EPA:JD:02/02/99)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

SEP 23 1999

REPLY TO THE ATTENTION OF

SR-6J

Mr. Bruce Brott, Supervisor
Minnesota Pollution Control Agency
520 Lafayette Road North
Saint Paul, Minnesota 55155-4184

Re: General Mills/Henkel Corporation Superfund Site
Five-Year Review Reports

Dear Mr. Brott:

The U. S. Environmental Protection Agency (U.S. EPA) has reviewed the Five-Year Review Report developed by the Minnesota Pollution Control Agency (MPCA) for the subject site. The report is hereby approved.

U.S. EPA appreciates the efforts of Dagmar Romano in conducting this review. If you have any questions, please contact Gladys Beard at (312) 886-7253.

Sincerely,

William E. Muno, Director
Superfund Division

Attachment

Minnesota Pollution Control Agency

September 9, 1999

Ms. Gladys Beard
U.S. Environmental Protection Agency
Region V
77 West Jackson Boulevard
Chicago, IL 60604

Dear Ms. Beard:

Enclosed please find our Five-Year Review for the General Mills/Henkel Corporation Superfund site. As you and I discussed previously, this is the second Five-Year Review for this site. As such, it is similar to the September 30, 1994 review but has been updated as appropriate. In addition, the recommendations in the earlier Five-Year Review have been modified slightly to reflect an approach that was discussed with and agreed to by Jon Peterson of your staff. Minnesota Pollution Control Agency (MPCA) staff is confident that the joint decision by MPCA staff and U.S. EPA to defer a determination regarding cleanup levels for TCE at the site until such time that the cleanup levels in the Consent Order have been reached is a prudent approach for the site.

Please contact me at (651) 296-7776 if there are any questions or you wish additional information.

Sincerely,

Dagmar Romano
Project Manager
Site Remediation Section
Metro District

DR:csa

Enclosure

520 Lafayette Rd. N.; St. Paul, MN 55155-4194; (651) 296-6300 (Voice); (651) 282-5332 (TTY)
Regional Offices: Duluth • Brainerd • Detroit Lakes • Marshall • Rochester

Five-Year Review Report
General Mills/Henkel Corporation

I. Introduction

Purpose

In 1994, the first Five-Year Review of the Remedial Action implemented at the General Mills/Henkel Corporation Site, Minneapolis, Minnesota was conducted. This Five-Year Review report constitutes the second review of this nature. The purpose of a Five-Year Review is to ensure that the remedial action implemented at the General Mills/Henkel Site remains protective of public health and the environment.

Section 121(c) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), 42 U.S.C. 9601 et seq, as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), requires that periodic reviews be conducted for Sites in which hazardous substances, pollutants, or contaminants remain at the Site after initiation of remedial actions. The periodic reviews must occur at least once every five years. The Five-Year Review requirement applies only to Record of Decisions selected after SARA and such reviews are referred to as statutory reviews. The U.S. EPA is also committed to conducting certain discretionary reviews called policy reviews which, although not required by the statute or National Contingency Plan, are conducted as a matter of policy. The General Mills/Henkel Five-Year Review was conducted as a matter of policy.

A three tier approach has been established for conducting Five-Year Reviews. The three types of Five-Year Review stress an analysis of the protectiveness of the remedy. Site-specific considerations, including the nature of the response action, the status of on-site response activities, and the proximity to populated areas and sensitive environmental areas, determine the level of review for a given Site. A level I review is the most basic type of evaluation of protectiveness and is appropriate for most Sites. A level II review involves a new risk assessment and is utilized when Site specific circumstances show it to be necessary. The U.S. EPA has determined that a level I review is appropriate for the General Mills/Henkel Site.

Site Characteristics

The General Mills/Henkel Corporation Superfund Site is located at 2010 East Hennepin Avenue in Minneapolis, Minnesota. The 10 acre facility was a technical research facility from 1930 to 1977 conducting both food and chemical research. From 1947 through 1962, a soil absorption pit which consisted of a series of three stacked, perforated 55-gallon drums buried 10-12 feet beneath the soil surface was used to dispose of laboratory solvents. General Mills has estimated that up to 1000 gallons of solvents were discharged into the waste pit annually from 1947 to 1962.

In June 1981, General Mills notified the MPCA that they intended to investigate the soil absorption pit. Eleven soil borings were drilled at the Site and results from three borings showed elevated levels of Volatile Organic Chemicals (VOCs).

The downgradient glacial pumpout wells are designed to contain and remove groundwater with TCE concentrations exceeding 270 parts per billion (ppb). The downgradient glacial drift groundwater is extracted at approximately 300 gallons per minute and the extracted water discharged to the Minneapolis Storm Sewer for eventual discharge to the Mississippi River through a National Pollution Discharge Elimination System (NPDES) permit. The pumpout wells began operation on December 5, 1985.

Three groundwater extraction wells (#108, #109, and #110) were installed on the General Mills Site and began operation on November 1, 1985. Two of the on-site extraction wells remove groundwater from the glacial drift aquifer and one on-site well removes groundwater from the Carimona member aquifer. The groundwater from the three on-site extraction wells is pumped to an on-site or stripper for treatment. The air stripper is treating approximately 150 gallons per minute with an efficiency of 99 percent. The treated groundwater is regulated by a State NPDES permit. Required effluent concentrations at the point of discharge into the Minneapolis Storm Sewer network are to contain less than 50 ppb of TCE based on an annual average and less than 100 ppb of TCE as a daily maximum.

In August 1992, two additional groundwater extraction wells were installed on-site by General Mills to remediate the Magnolia member aquifer. Pursuant to the Consent Order between General Mills and MPCA, additional groundwater extraction is required if monitoring wells in the Magnolia member aquifer showed TCE concentrations greater than 27 ppb. The groundwater extracted from the Magnolia member aquifer is discharged into the Minneapolis Storm Sewer network. The NPDES permit has been amended and reissued to include provisions for the new discharge into the storm sewer network from the Magnolia member aquifer extraction wells. Due to zone of groundwater influence from the two Magnolia member aquifer pumping wells, the Carimona member (#108) pumping well has been shut down. Influence to the air stripper is now approximately 200 gallons per minute. To prevent access to the Site, fencing surrounding the Site has been in place prior to the investigation beginning in 1981. The former research family now houses light industrial businesses.

I. Discussion of Remedial Objectives

Glacial Drift Aquifer

The cleanup standard for the glacial drift aquifer is 270 ppb for TCE. The 270 ppb value was agreed upon in the 1984 Consent Order between General Mills and MPCA. Approximately 400 gallons per minute is pumped form the glacial drift aquifer. TCE near 100 ppb is present outside the groundwater capture zone.

Carimona Member of the Plattville Formation

The cleanup standard for the groundwater in the Carimona member is 27 ppb of TCE. The groundwater pump and treatment system has been recently modified by General Mills such that the extraction well on-site for the Carimona member has been replaced with two extraction wells in the deeper Magnolia member. Field observations have shown that contamination in the Carimona member is being contained by the two Magnolia extraction wells.

ARARs for the Site remedy are as follows:

1. Safe Drinking Water Act (SDWA), 40 CFR Pass 141-143. Establishes Maximum Contaminant Levels (MCLs) for groundwater remediation.

2. National Pollution Discharge Elimination Permit – Permit Number 0056022 - Dated August 1992.

3. Minn. R. 4717.7100 to 4717.7800. Health Risk Limits (HRLs) for groundwater contaminants.

4. Minn. R. ch. 7050 for discharge to a surface water body.

5. Minn. R. 7060. Establishes uses and nonegradation goal for groundwater.

6. Minn. R. 4725. Water well code. Establishes standards for the construction, maintenance and sealing of wells.

7. Clean Water Act for NPDES discharge requirements.

8. Clean Air Act for air stripper requirements.

The remedial action performance standards for groundwater are 270 ppb of TCE in the glacial drift aquifer and 27 ppb for the Carimona member and Magnolia member. Table 1 identifies the MCLs, HRLs, and cleanup goals for the TCE in groundwater for the General Mills Site and Table B-6 through B-11 present historical groundwater monitoring data.

The NPDES permit for the treated and untreated groundwater was modified in 1992 and monitoring has shown compliance with the discharge requirements.

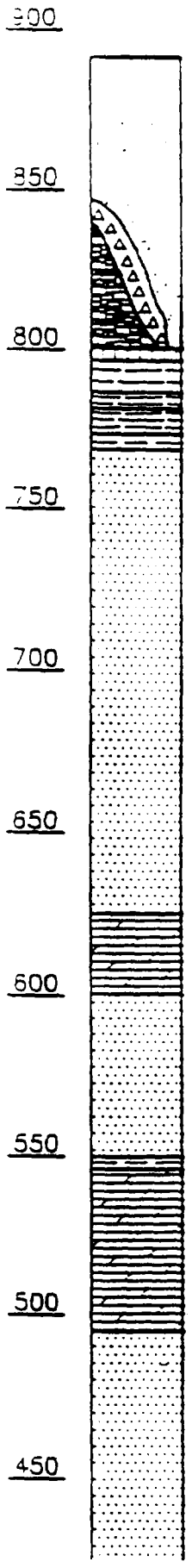
Recommendations

The cleanup level for TCE established in the Consent Order, referenced above, shall be met before the Consent Order is terminated.

A determination regarding the protectiveness of the remedy will be made once the cleanup level for TCE has been achieved, using the standards and requirements in effect at that time, and prior to termination of the Consent Order.

If it is determined that the remedy is not protective, action shall be taken by the MPCA or U.S. EPA to ensure that the 5 ppb standard for TCE or whatever the current standard is (the lowest of MCL, HRL or standard in effect at that time) is achieved.

The St. Peter Sandstone which is not part of the Consent Order between General Mills and MPCA appears to have contamination at levels greater than 5 ppb TCE. Routine monitoring should continue in the St. Peter to demonstrate the effectiveness of the remedial action in preventing the migration of TCE throughout the aquifer system in the area.



Alluvium

Sand, gravel sand and silty sand, sometimes overlain by loess and marsh deposits which have been drained and filled. Overlying soil is varies in composition often clayey or silty. Deposits as terrace deposits from Glacial River Warren. Thickness ages from 23 to 57 feet.

Glacial Till

Gray and red tills associated with Des Moines and Superior lobes. Unsorted material with variable texture containing clay sizes as boulders. Sometimes underlain by thin layer of alluvium. Contains sand lenses. Absent in many places, up to 20' thick.

Decorah Shale

Greenish-gray to olive-gray claystone, fissile, fossiliferous, contains several limestone layers. Patchy in this area. Thickness range up to 50'.

Platteville/ Glenwood Formations

Carimona member – marls, fossiliferous often fractured and weathered, 3.5–4.5' thick.
Mosalia member – fossiliferous marls, calcitic shale, with ripple passing, corroded zones, some fractures. 8.5–9' thick.
Hidden Falls– marls, shaly, fossiliferous. 6–7' thick.
Biffin member – thin beds of limestone, interbedded shale 12–13' thick.
Pecatonica Member – dolomite, hard, 1–1.5' thick.
Glenwood Beds – green shale, sandy at the base, 3–5' thick.

St. Peter Sandstone

Light yellower white, medium grained, massive appearing sandstone composed of rounded and subrounded grains. Thin beds of green shale are present. Ranges in thickness from 150–170'.

Prairie Du Chien Group

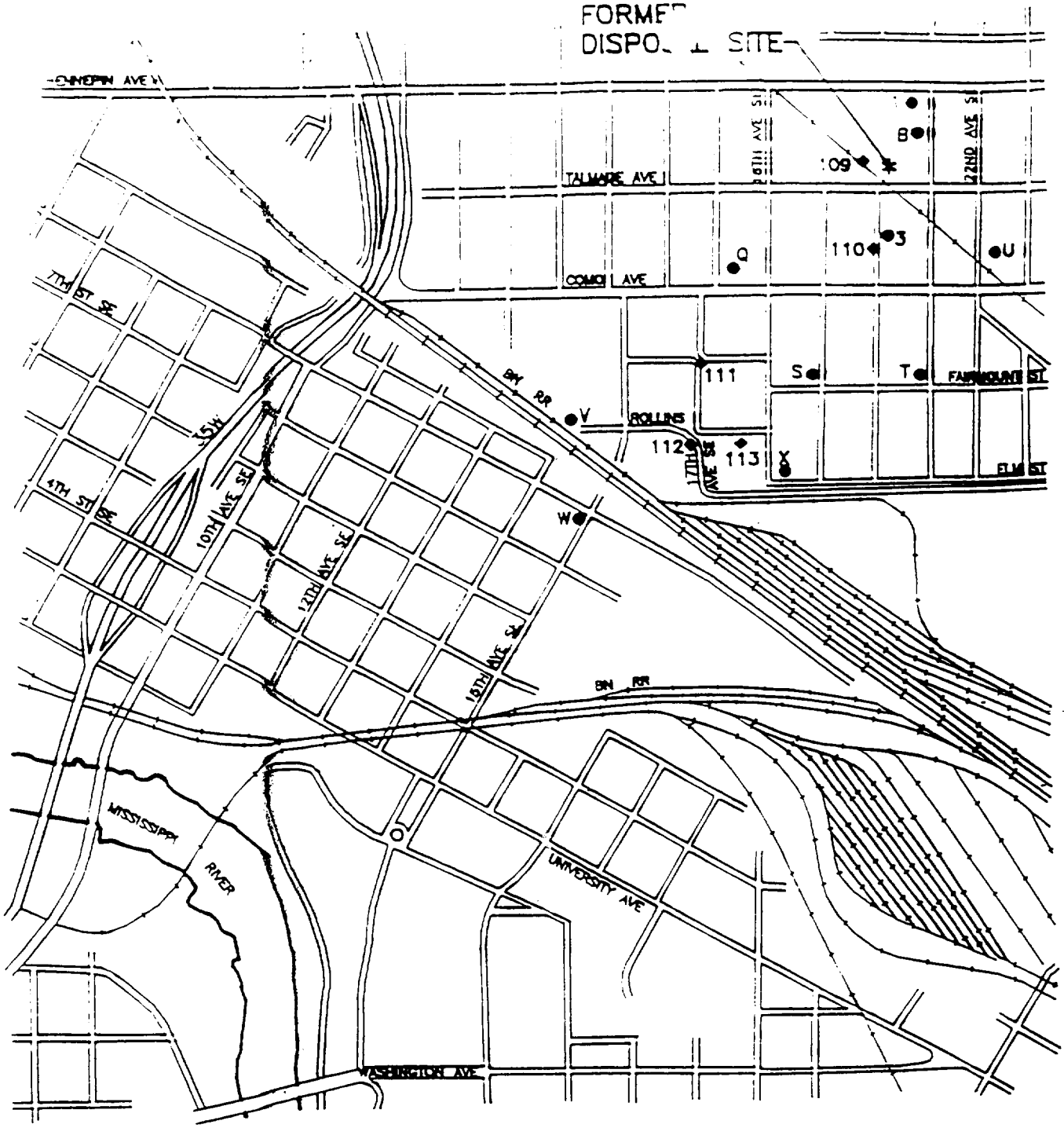
Oneota Dolomite – thin to thick bedded, light brownish-gray or buff, fine- to medium-grained dolomite, minor amounts of shale and pure cherts.
New Richmond Sandstone – fine- to medium-grained quartzose sandstone and quartzitic dolomite, minor amounts of shale and pure dolomite.
Willow River Dolomite – thin to thick bedded dolomite, sandy dolomite with some interbedded quartzose sandstone.
Thickness of entire formation is 120'–150'.

Jordan Sandstone

Argillaceous and dolomitic quartz sandstone with pebble-size clasts of dolomitic sandstone and thin beds of dolomite, white or yellow, coarse to medium-grained orthoquartzites to yellow silty, fine-grained quartzitoses sandstone. 85–100' thick. Underlaying the St. Lawrence formation which is 120'–200' thick and contains a variety of silty or sandy dolomitic rocks.

Figure 1

GENERALIZED GEOLOGIC COLUMN



● GLACIAL DRIFT MONITORING WELL

◆ GLACIAL DRIFT PUMP-OUT WELL

0 1000

SCALE IN FEET

Figure 2

GLACIAL DRIFT AQUIFER
1992 MONITORING LOCATIONS

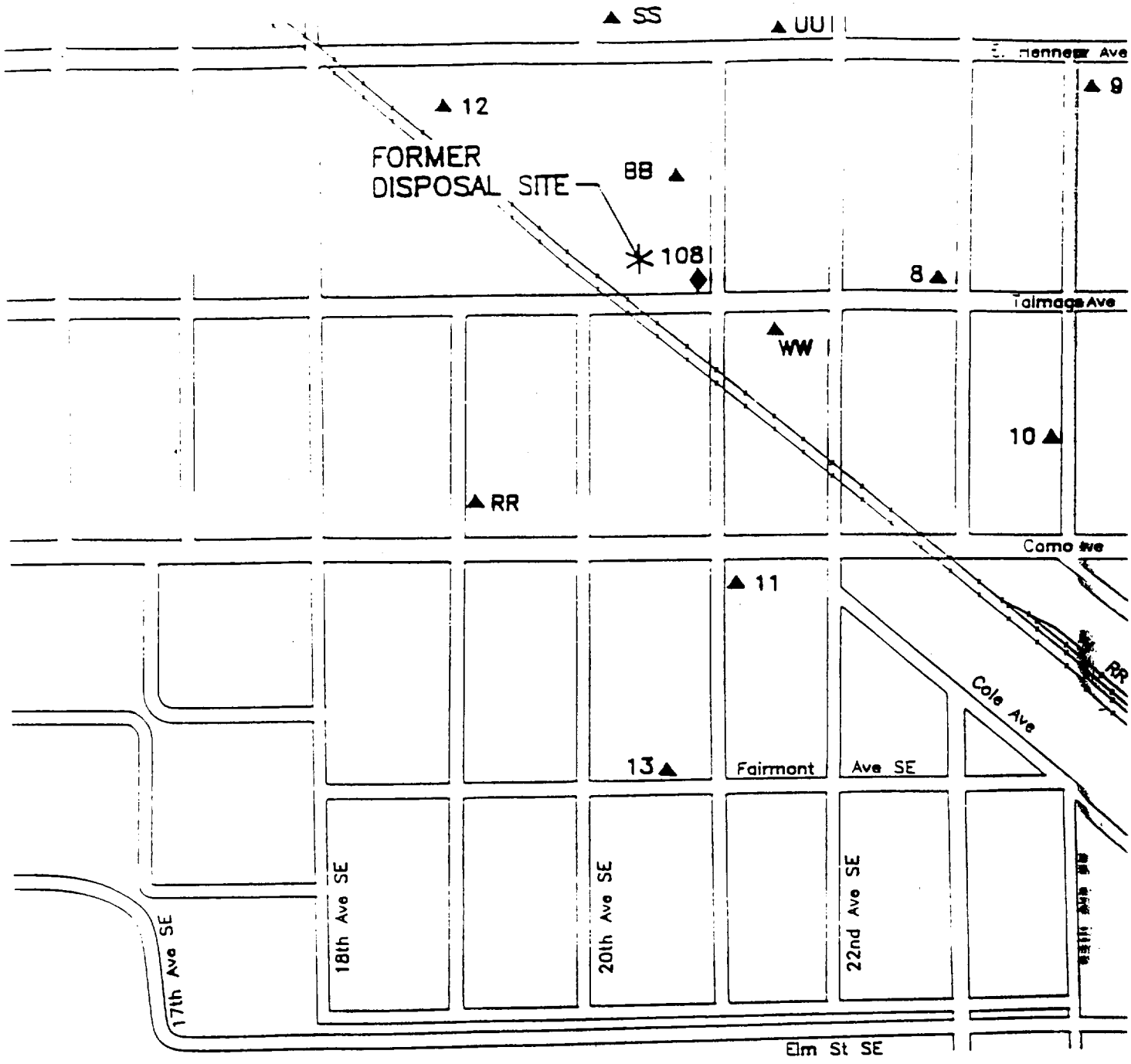


Figure 3

CARIMONA MEMBER
1992 MONITORING LOCATIONS

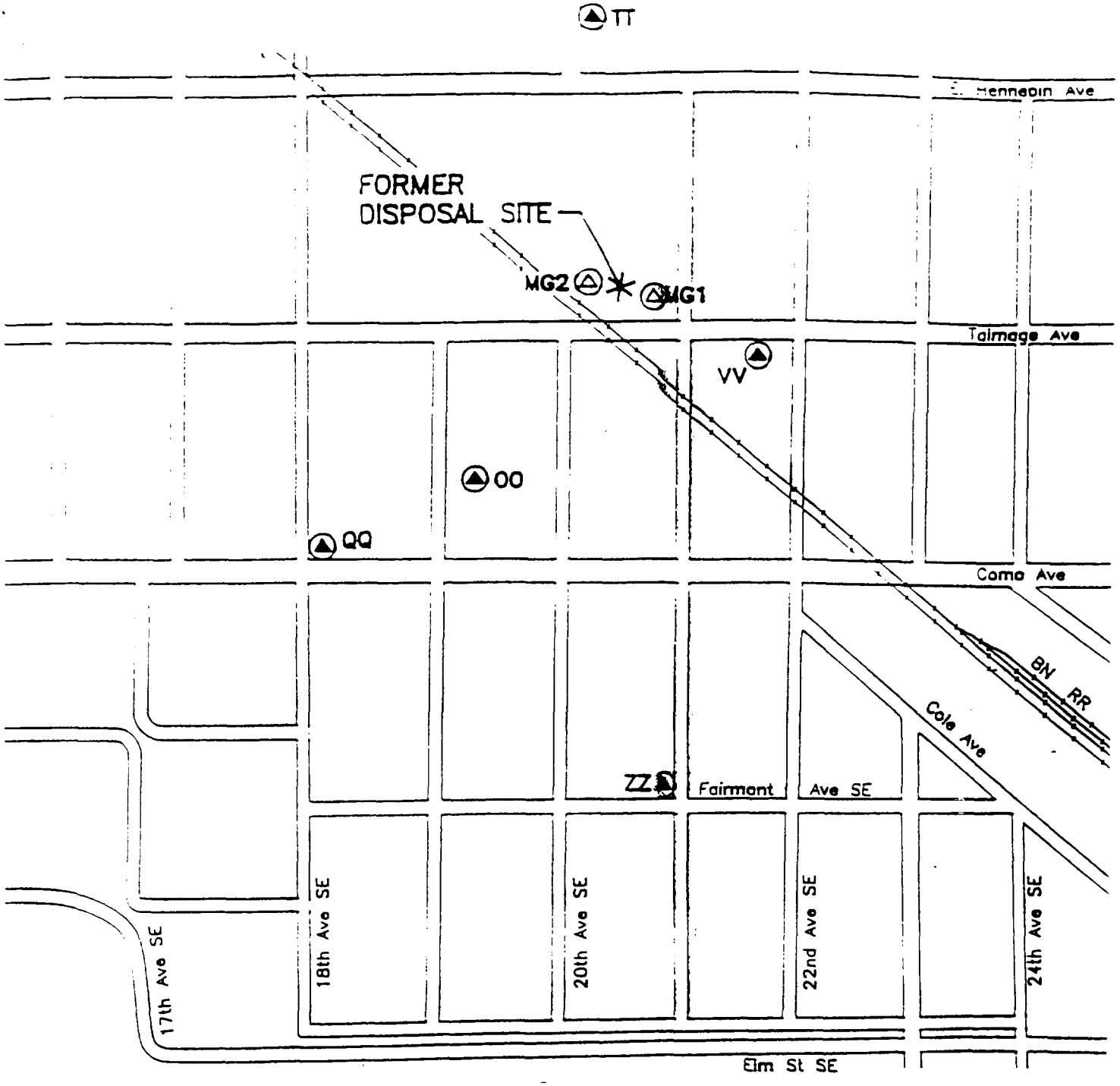
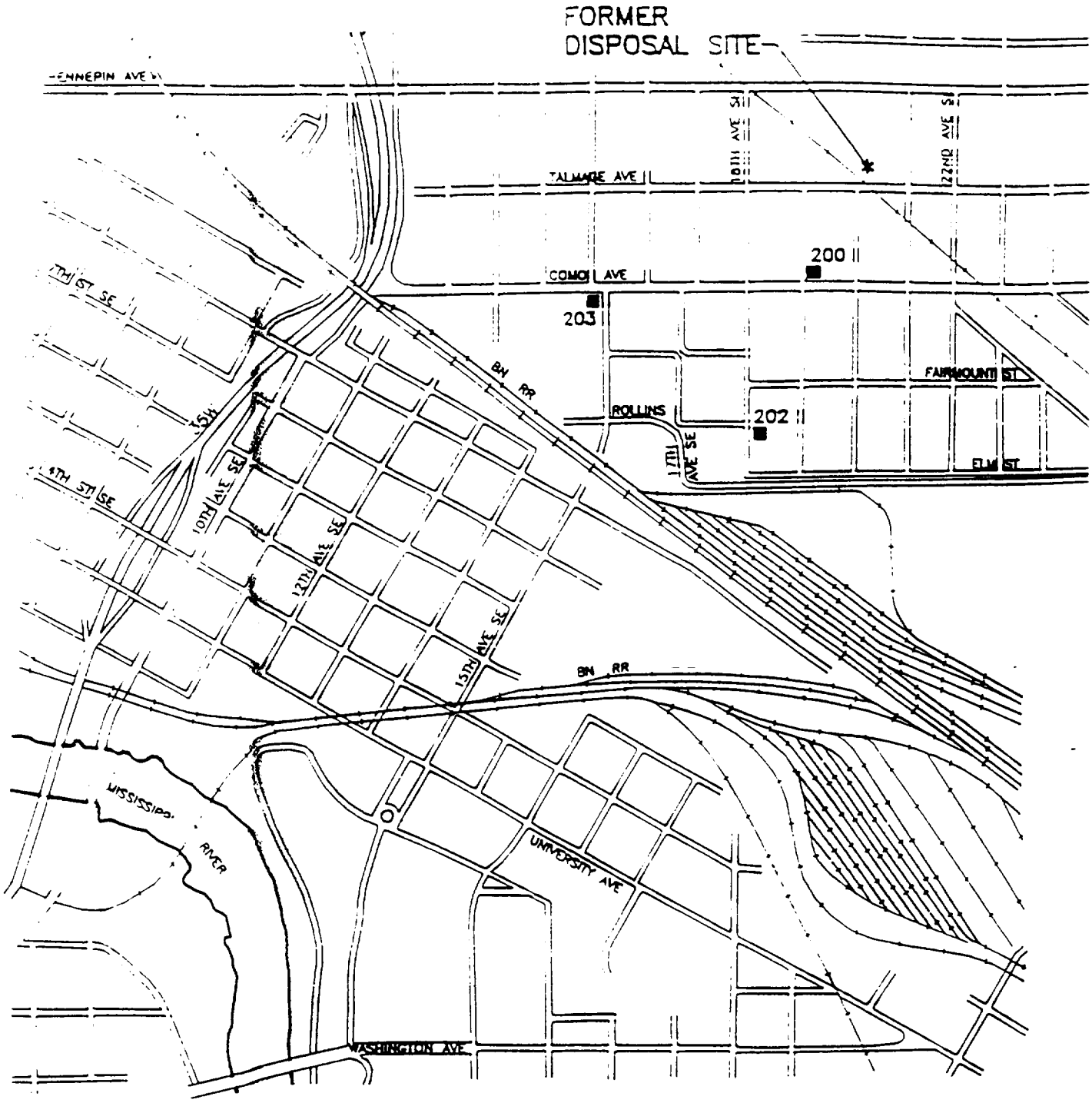


Figure 4

MAGNOLIA MEMBER
1992 MONITORING LOCATIONS



■ ST. PETER SANDSTONE MONITORING WELL

Figure 5

ST. PETER SANDSTONE
1992 MONITORING LOCATIONS

TABLE 1
GROUNDWATER CLEANUP STANDARDS

Chemical Parameter	MCL	HRL
Trichloroethylene	5 ug/l	30

Groundwater Cleanup Goal for TCE

Glacial Drift Aquifer - 270 ug/l

Carimona Member - 27 ug/l

Magnolia Member - 27 ug/l

St. Peter Sandstone - None

Prairie Du Chien/Jordan - None

Table B-6 (cont.)
Historical Water Quality Data
Glacial Drift Wells
Trichloroethene

[Consent Order Limit: 270 ug/L]

(concentrations in ug/L)

DATE	1	3	4
04/82	6	780	4.5
12/83	27	800	380
10/85	1.4	1100	--
11/85	--	--	440
12/85	1.5	770	440
02/86	1.4 s	680	200
04/86	3.1	1200	210
06/86	8.1	1300	180
08/86	9.3	890	280
10/86	0.9	720	200
04/87	2.7	740	120
07/87	0.4	770	--
10/87	0.8	960	--
04/88*	<0.50	440	55
07/88*	0.5	140	--
10/88*	<0.50	98	--
04/89	0.8	320	55
07/89	0.6 s	340	--
10/89	0.5	530	--
05/90	--	520	77
07/90	0.8	770	--
10/90	<0.5	310	--
04/91	3.1	1500	--
09/91	1.3	300	--
05/92	2.2	400	--
11/92	0.5	170	--
05/93	<0.50	470	--
11/93	<0.50	740	--

* The 1988 analytical data has been determined to be unreliable due to laboratory equipment and method performance problems.

s Potential false positive value based on statistical analysis of blank sample data.

-- Not analyzed.

Table B-6 (cont.)
Historical Water Quality Data
Glacial Drift Wells
Trichloroethene

[Consent Order Limit: 270 ug/L]

(concentrations in ug/L)

DATE	B	Q	R	S	T
05/92	510	<1.0	--	510	<1.0
11/92	--	--	--	770	--
05/93	580	<0.50	--	390	<0.50
11/93	--	--	--	400	--
08/94	--	<0.5	--	--	<0.5
09/95	--	<0.50	--	--	<0.50
08/96	--	<0.5	--	--	<0.5
08/97	--	<0.5	--	--	<0.5
10/98	--	<0.5	--	--	<0.5

-- Not analyzed.

Table B-6 (cont.)
Historical Water Quality Data
Glacial Drift Wells
Trichloroethene

[Consent Order Limit: 270 ug/L]

(concentrations in ug/L)

DATE	U	V	W	X
02/84	<1.3	–	–	–
03/84	–	78	7.5	2.2
10/85	2.6	220	8.1	2.1
12/85	3.9	140	32	5
02/86	2.9	180	14	0.9 s
04/86	3.2	170	18	0.9
06/86	1.6	97	10	0.9
08/86	16	130	18	0.7
10/86	1.4	92	6.2	0.5
04/87	2.7	160	24	–
07/87	–	180	42	–
10/87	–	140	56	–
04/88*	–	160	43	DRY
07/88*	–	33	8.1	–
10/88*	–	37	26	–
04/89	–	130	57	DRY
07/89	–	120	22	–
10/89	–	120	25	–
05/90	–	110	31	DRY
07/90	–	120	<0.5	–
10/90	–	110	11	–
04/91	2	130	40	–
09/91	–	73	20	–
05/92	<1.0	63	5.9	<1.0
11/92	–	83	1.3	–
05/93	0.7	68	2.9	<0.50
11/93	–	100	2.9	–

* The 1988 analytical data has been determined to be unreliable due to laboratory equipment and method performance problems.

s Potential false positive value based on statistical analysis of blank sample data.

– Not analyzed.

Table B-6 (cont.)
Historical Water Quality Data
Glacial Drift Wells
Trichloroethene

[Consent Order Limit: 270 ug/L]

(concentrations in ug/L)

DATE	U	V	W	X
08/94	--	69	8.4	<0.5
09/95	--	94	0.8	<0.50
08/96	--	100	1.4	<0.5
08/97	--	19	1.5	<0.5
10/98	--	140	15	<0.5

* The 1988 analytical data has been determined to be unreliable due to laboratory equipment and method performance problems.

-- Not analyzed.

Table B-6
Historical Water Quality Data
Glacial Drift Wells
Trichloroethene

[Consent Order Limit: 270 ug/L]

(concentrations in ug/L)

DATE	B	Q	R	S	T
04/82	6.0	--	--	--	--
12/82	1100	--	--	--	--
12/83	780	--	--	--	--
02/84	--	<1.3	670	770	<1.3
10/85	1200	20	1100	740	<0.3
12/85	1100	14	820	750	<0.8
02/86	1300	11	31	650	<0.5
04/86	1000	13	DRY	1100	<0.2
06/86	1100	4.7	160	930	<0.2
08/86	1000	5.6	DRY	880	<0.2
10/86	--	3.2	--	620	<0.2
11/86	830	--	--	--	--
04/87	800	2.6	DRY	650	<0.2
07/87	--	--	DRY	740	--
10/87	--	--	--	1000	--
04/88*	330	0.86	DRY	460	<0.50
07/88*	--	--	DRY	160	--
10/88*	--	--	DRY	110	--
04/89	250	1.1	DRY	860	<0.5
07/89	--	--	DRY	620	--
10/89	--	--	DRY	630	--
05/90	--	0.7	DRY	710	<0.5
07/90	330	--	DRY	200	--
10/90	--	--	DRY	770	--
04/91	340	0.7	--	870	<0.5
09/91	--	--	--	480	--

* The 1988 analytical data has been determined to be unreliable due to laboratory equipment and method performance problems.

-- Not analyzed.

Table B-7
Historical Water Quality Data
Carimona Member Wells
Trichloroethene

[Consent Order Limit: 27 ug/L]

(concentrations in ug/L)

DATE	BB	RR	SS	UU	WW
05/82	--	46	--	--	--
06/82	1600	--	--	--	--
12/82	1600	43	<0.05	78	2100
12/83	1400	33	<1.5	81	1700
10/85	1900	110	0.4 s	150	2300
12/85	1100	95	1.2	79	1200
02/86	1300	88	<0.5	71	740
04/86	2200	170	0.4	81	540
06/86	2100	85	0.3	37	290
08/86	1800	100	0.3	45	220
10/86	--	--	<0.2	36	--
11/86	1300	100	--	--	290
04/87	1100	110	1.2	12	290
04/88*	530*	220	<0.50	23	320
04/89	340	180	1.3	38	530
05/90	--	60	4.1	35	450
07/90	530	--	--	--	--
04/91	1100	150	4.5	64	420
09/91	--	--	--	--	--
05/92	870	90	2.2	23	700
05/93	940	93	2.5	29	130
08/94	--	--	1	8.6	--
09/95	--	--	0.89	6	--
08/96	--	--	2.2	47	--
08/97	--	--	1.4	48	--
10/98	--	--	<0.5	23	--

* The 1988 analytical data has been determined to be unreliable due to laboratory equipment and method performance problems.

s Potential false positive value based on statistical analysis of blank sample data.

-- Not analyzed.

Table B-7 (cont.)
Historical Water Quality Data
Carimona Member Wells
Trichloroethene

[Consent Order Limit: 27 ug/L]

(concentrations in ug/L)

DATE	8	9	10	11	12	13	108
04/83	820	--	--	--	--	--	--
11/83	--	--	--	--	--	--	1100
12/83	96	<0.05	2.6	120	<1.5	--	--
01/84	--	--	--	--	--	--	1100
03/84	--	--	--	--	--	25	--
10/85	2300	17	1500	2.7	--	1.9	--
11/85	--	--	--	--	<0.2	--	1500
12/85	650	10	1100	520	<0.8	21	820
02/86	240	6.7	420	250	<0.5	9.7	700
04/86	180	8	290	120	0.5	120	750
06/86	140	6.1	280	58	<0.2	130	640
08/86	160	6.7	270	67	0.2	14	580
10/86	110	5.4	220	40	<0.2	0.5	540
04/87	86	5.1	120	160	<0.2	140	450
07/87	--	0.6	150	25	<0.2	--	580
10/87	--	9.5	170	180	<0.5	--	560
04/88*	160	4.5	56	79	<0.5	<0.50	200
07/88*	--	1.7	34	0.3	<0.5	--	96
10/88*	--	10	58	0.7	1.0 s	--	87
04/89	380	9.8	160	110	<0.5	110	530
07/89	--	9.9	99	3.6	2.1	--	340
10/89	--	12	140	5	<0.5	--	--
12/89	--	--	--	--	--	--	490
05/90	100	8.5	150	<0.5	0.7	110	570
07/90	--	43	180	16	<0.5	--	400
10/90	--	9.4	130	240	<0.5	--	420
04/91	80	7.3	110	8.7	<0.5	<0.5	710
09/91	--	10	120	3.2	<0.5	--	76
05/92	47	3.2	58	190	<1.0	71	380
11/92	--	2.4	59	66	<0.5	--	--

* The 1988 analytical data has been determined to be unreliable due to laboratory equipment and method performance problems.

s Potential false positive value based on statistical analysis of blank sample data.

-- Not analyzed.

Table B-7 (cont.)
Historical Water Quality Data
Carimona Member Wells
Trichloroethene

[Consent Order Limit: 27 ug/L]

(concentrations in ug/L)

DATE	8	9	10	11	12	13	108
05/93	92	1.9	46	120	<0.50	26	--
06/93	--	--	--	--	--	--	640
11/93	--	0.78	43	180	<0.50	--	300
08/94	38	0.81	20	21	<0.5	--	--
09/95	40	--	38	3.3	<0.50	--	--
01/96	--	<0.50	--	--	--	--	--
08/96	35	3	24	17	<0.5	--	--
08/97	36	3.7	34	12	<0.5	--	--
10/98	44	4.8	42	16	<0.5	--	--

-- Not analyzed.

Table B-8
Historical Water Quality Data
Magnolia Member Wells
Trichloroethene

[Consent Order Limit: 27 ug/L]

(concentrations in ug/L)

DATE	OO	QQ	TT	VV	ZZ
05/82	15	--	--	--	--
06/82	--	13	--	--	--
12/82	56	13	8.9	--	--
03/84	--	--	--	--	14
10/85	49	2.9	26	140	85
12/85	31	7.3	19	93	28
02/86	36	5.2	27	92	200
04/86	120	6	33	280	440
06/86	27	1	20	83	91
08/86	19	0.6	40	99	39
10/86	32	6.4	23	77	190
04/87	130	2.5	34	63	230
04/88*	160	<0 50	16	63	130
07/88*	20	--	--	9.4	--
10/88*	34	--	--	25	43
04/89	90	3.7	30	59	180
07/89	70	--	--	87	34
10/89	67	--	--	150	33
05/90	58	3.4	26	33	120
07/90	62	--	--	27	61
10/90	30	--	--	46	36
04/91	5.1	<0.5	140	75	170
09/91	5	--	--	48	--
05/92	3.1	--	58	60	88
06/92	--	4.7	--	--	--
11/92	17	--	6.4	29	96

* The 1988 analytical data has been determined to be unreliable due to laboratory equipment and method performance problems.

-- Not analyzed.

Table B-8 (cont.)
Historical Water Quality Data
Magnolia Member Wells
Trichloroethene

[Consent Order Limit: 27 ug/L]

(concentrations in ug/L)

DATE	OO	QQ	TT	VV	ZZ
05/93	11	13	0.7	190	73
11/93	5.7	--	1.8	150	70
08/94	--	3.2	1.4	--	--
09/95	--	3.7	1.5	--	--
08/96	--	2.2	1.0	--	--
08/97	--	1.8	1.9	--	--
10/98	--	<0.5	<0.5	--	--

-- Not analyzed.

Table B-9
Historical Water Quality Data
St. Peter Sandstone Wells
Trichloroethene

(concentrations in ug/L)

DATE	200	201	202	203
10/85	–	0.5 s	–	–
11/85	120	–	2.6	0.5 s
12/85	100	2.9	2	1.2
02/86	72	<0.5	1.9	2.5
04/86	130	<0.2	0.2	0.6
06/86	110	<0.2	0.2 s	0.5
08/86	110	<0.2	2.7	0.5
10/86	78	<0.2	<0.2	0.5
04/87	100	0.1	<0.2	0.7
07/87	120	–	–	–
10/87	160	–	–	–
04/88*	89	<0.50	<0.50	<0.50
07/88*	33	–	–	–
10/88*	56	–	–	–
04/89	150	<0.5	<0.5	2.1
07/89	130	–	–	–
10/89	120	–	–	–
05/90	110	<0.5	0.8	2.8
07/90	11	–	–	–
10/90	130	–	–	–
04/91	140	<0.5	<0.5	3
09/91	77	–	–	–
05/92	61	<1.0	<1.0	1.2
11/92	64	–	–	–

* The 1988 analytical data has been determined to be unreliable due to laboratory equipment and method performance problems.

s Potential false positive value based on statistical analysis of blank sample data.

– Not analyzed.

Table B-9 (cont.)
Historical Water Quality Data
St. Peter Sandstone Wells
Trichloroethene

(concentrations in ug/L)

DATE	200	201	202	203
05/93	89	<0.50	<0.50	1.4
11/93	19	--	--	--
12/94	110	--	--	--
09/95	110	--	--	--
08/96	96	--	--	--
07/97	98	<0.5	<0.5	5.4
08/97	97	<0.5	--	5.0
12/97	--	--	<0.5	--
10/98	58	--	<0.5	4.5

-- Not analyzed.

Table B-10
Historical Water Quality Data
Prairie Du Chien/Jordan Well
Trichloroethene

(concentrations in ug/L)

DATE	Henkel
10/85	71
12/85	44
02/86	48
04/86	OFF
06/86	OFF
08/86	54
11/86	6.9
04/87	7.1
07/87	20
10/87	6.7
04/88*	13
07/88*	1.5
10/88*	8
04/89	12
07/89	10
10/89	11
07/91	49
09/91	18
05/92	31
11/92	<0.5
05/93	16
11/93	36
08/94	6.1
12/95	6.5
08/96	9.2
08/97	13
10/98	8.2

* The 1988 analytical data has been determined to be unreliable due to laboratory equipment and method performance problems.

Table B-11
Historical Water Quality Data
Site Pump-Out and Treatment System
Downgradient Pump-Out System
Trichloroethene

(concentrations in ug/L)

DATE	Discharge (1)	Influent (2)	Effluent 100/50 (3)	MG-Effluent (4)
11/85	160	1200	13	--
12/85	140	870	12	--
01/86	--	1100	17	--
02/86	290	760	8.4	--
03/86	--	1700	14	--
04/86	400	860	11	--
06/86	250	--	--	--
08/86	350	870	6.7	--
10/86	190	610	1	--
03/87	320	730	6.8	--
04/87	170	530	8.3	--
07/87	310	660	2.8	--
10/87	230	720	<0.5	--
11/87	--	490	2.6	--
01/88*	300	470	4.4	--
04/88*	210	370	5.3	--
07/88*	70	160	1.2	--
10/88*	64	--	--	--
11/88*	--	84	3.7	--
01/89	210	390	9.8	--
04/89	200	440	13	--
07/89	170	380	20	--
10/89	110	--	--	--
12/89	--	140	190	--
01/90	140	380	96	--
05/90	220	370	1.2	--
07/90	180	310	0.9	--
10/90	100	360	2.9	--

(1) Flow rate weighted composite sample (pump-out wells 111, 112, and 113)

(2) Flow rate weighted composite sample (pump-out wells 108, 109, and 110 from 1985 to 1993, Pump-out wells 109 and 110 from 1994 to present).

(3) Effluent from treatment system. NPDES daily limit: 100 ug/L and NPDES annual average limit: 50ug/L

(4) Effluent from site pump-out wells MG1 and MG2.

* The 1988 analytical data has been determined to be unreliable due to laboratory equipment and method performance problems.

-- Not analyzed.

Table B-11 (cont.)
Historical Water Quality Data
Site Pump-Out and Treatment System
Downgradient Pump-Out System
Trichloroethene

(concentrations in ug/L)

DATE	Discharge (1)	Influent (2)	Effluent 100/50 (3)	MG-Effluent (4)
01/91	150	430	0.8	–
04/91	290	890	1	–
07/91	210	370	<0.5	–
09/91	110	320	<0.5	–
01/92	99	260	<1.0	–
05/92	55	320	8.3	–
08/92	78	420	15	–
11/92	110	450	28	32
03/93	130	270	<0.50	–
05/93	82	450 h	<0.50	22
08/93	83	530	<0.50	33
11/93	78	630	<0.50	24
03/94	140	540	<0.5	25
06/94	60	430	<0.5	23
08/94	58	310	<0.5	17
12/94	65	400	<0.50	18
03/95	93	650	7.6	26
05/95	87	580	20	25
09/95	53	450	0.63	15
12/95	68	410	2.7	15
03/96	63	360	38	18
07/96	77	390	1	21
08/96	40	400	64	19
11/96	59	370	<0.5	22
02/97	89	390	1.8	22
05/97	90	390	3.8	23
08/97	82	370	68	17
12/97	64	410	38	19
01/98	56	370	0.5	19
04/98	52.1	384.5	2.0	19.9
08/98	125.2	442.2	<0.5	30.5
10/98	59	418.6	200	40

(1) Flow rate weighted composite sample (pump-out wells 111, 112, and 113)
(2) Flow rate weighted composite sample (pump-out wells 108, 109, and 110 from 1985 to 1993, Pump-out wells 109 and 110 from 1994 to present).
(3) Effluent from treatment system. NPDES daily limit: 100 ug/L and NPDES annual average limit: 50ug/L
(4) Effluent from site pump-out wells MG1 and MG2.
h EPA sample extraction or analysis holding time was exceeded.
– Not analyzed.